ZT LN01 Network Node

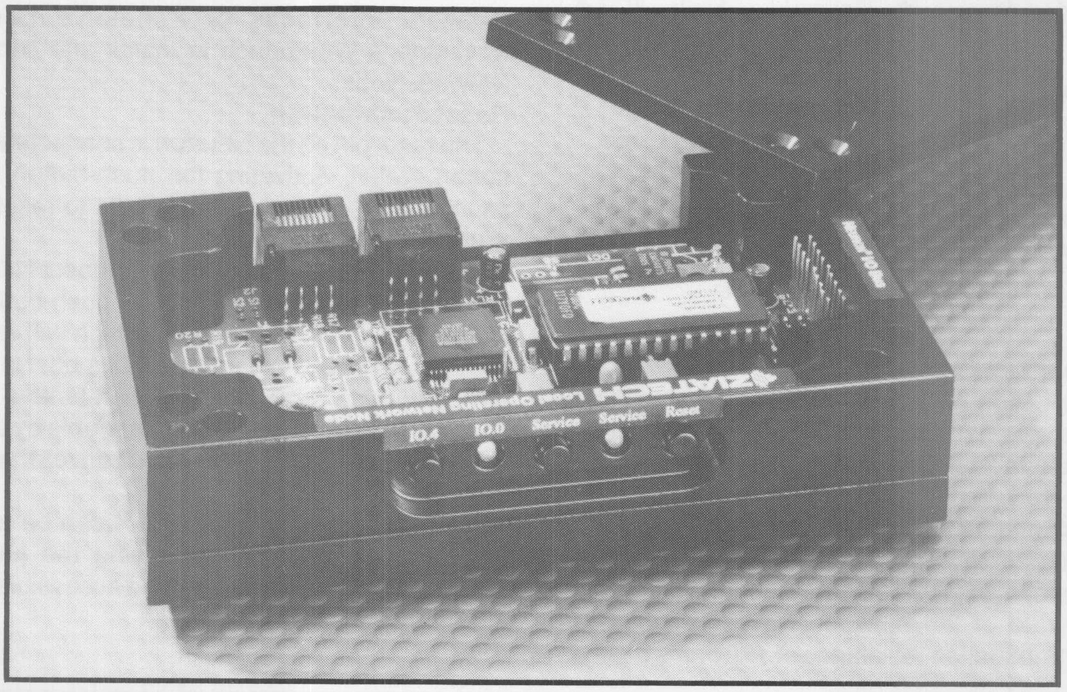
for LonWorks™ Control Networks

Small, stackable module containing Echelon's Neuron® and a communication transceiver

Ziatech's Network Node is a LonWorks™-compatible component. LonWorks is new technology created by Echelon Corporation, which facilitates the development of distributed, intelligent control systems in a wide variety of applications. A LonWorks control network consists of a series of nodes equipped with Neuron integrated circuits. The Neurons communicate to each other through a message-based protocol called LonTalk™. Application software for each Neuron node on the network is developed with the LonBuilder™ Developer's Workbench. Once the node application software is developed, the node I/O can be prototyped and debugged using the Ziatech ZT LN01 Network Node, and if appropriate, one or more stacking I/O modules.

The ZT LN01 Network Node is a stackable, self-contained node equipped with an Echelon Neuron integrated circuit, one of three transceiver interfaces, and simple I/O in the form of an LED and switch. Packaged in an aluminum case with top and bottom plates, each node can be powered via +12V on the network cable, or through an external power supply.

An additional prototyping I/O module (ZT LN70) can be stacked to the ZT LN01 Node. The ZT LN70 prototyping module with Speedwire™ pins provides access to each of the 11 I/O lines from the Neuron. The reusable feature of Speedwire, combined with its increased reliability over wirewrap, provides a cost-effective means for prototyping Neuron I/O designs for an application-specific node.



- Fast, efficient prototyping
- LonWorks control network access
- Compatible with Ziatech Network Interfaces
- 76.2mm (3.0") x 127.0mm (5.0") x 19.0mm (0.75") size
- Service request push-button I/O
- Reset push-button
- Jumperable LED and push-button I/O
- Three twisted-pair transceiver options:
  - RS-485, 4.8 Kbps–1.25 Mbps
  - Isolated, 78 Kbps
  - Isolated, 1.25 Mbps
- Stackable I/O prototyping option
- Two-year warranty

Preliminary Data Sheet

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Functional Considerations

ZT LN01 Node

The ZT LN01 Network Node is a stackable, self-contained node incorporating an Echelon 3150™ Neuron integrated circuit, one of three transceiver interfaces, a service pin push-button/indicator, a reset button, and simple I/O in the form of an LED and switch *(see Figure 1)*.

Neuron Chip

Intelligent nodes in a LonWorks control network are equipped with Neurons to provide information exchange across the network media. The 3150 Neuron is implemented within the ZT LN01 Network Node and operates at 10 MHz. It utilizes external memory to store the application program.

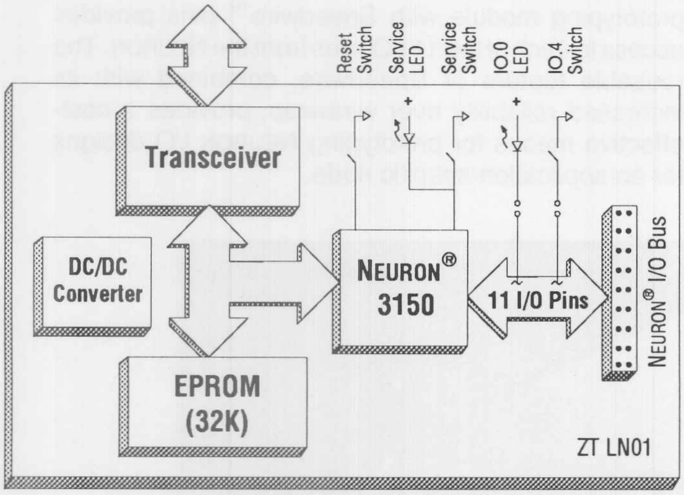

Figure 1. ZT LN01 functional block diagram.

Transceiver Options

Communication over the network is accomplished via transceivers. Three serial, twisted-pair transceiver options are available as illustrated in ***Table 1***.

The RS-485 implementation (default) offers the lowest cost for communication of up to 32 nodes over the distances listed in ***Table 2***. Note that unlike the isolated options, the RS-485 cable length is dependent on the bit rate of the network. No cable stubs are allowed; a termination resistance of 120 ohms must be provided at each end of the cable; and ±7V of ground differential is allowed between nodes.

The transformer-isolated transceiver options allow up to 64 nodes to be included in a LonWorks control network. Stubs are allowed and a special termination circuit must be provided at each end of the cable. Because of the transformer isolation, common mode voltages between nodes are not a concern.

Ziatech's Network Interfaces can supply fused +12V on a twisted-pair for powering the nodes. If the RS-485 transceiver option is specified, a simple voltage regulator on the ZT LN01 supplies the voltage used to power the node. If an isolated transceiver is specified, a DC/DC converter is used on the node for power. The transformer allows high common mode voltages to be tolerated between nodes.

Service Pin

The service pin on the Neuron is a bidirectional signal. Under the control of the Neuron, this pin lights an LED when not configured with network address information. When switched to ground with a push-button switch, the Neuron will transmit a network management message containing its 48-bit unique ID on the network. This information is used by Ziatech's Network Interfaces or Echelon's LonBuilder Developer's Workbench to install and configure the Network Node.

Reset Push-button

The reset pin on the Neuron is connected to a push-button switch. Activating the push-button switch will cause the Neuron on the ZT LN01 to reset.

Jumperable I/O

Two jumpers are provided to connect Neuron IO.0 and IO.4 pins to an LED and push-button switch respectively. When driving IO.0 high with a logical 1, the LED lights up. When the LED is off, Neuron IO.0 pin is low. When activating the push-button, an input to Neuron IO.4 is initiated that is readable by an application program. Pressing this switch drives the IO.4 input high.

Neuron I/O pins IO.0 and IO.4 can be used by an application program by removing the jumpers. All eleven Neuron I/O pins are then accessible through a stacking connector.

Option	Implementation	Speed	# Nodes	Length	Isolation
Default	RS-485	4.8 Kbps-1.25 Mbps	32	1,219-18 m • 4,000-60 ft.	—
01	Transformer Coupled	78 Kbps	64	1,372 m • 4,500 ft.	1.5 KV for 60s
02	Transformer Coupled	1.25 Mbps	64	457 m • 1,500 ft.	1.5 KV for 60s

Table 1. Serial, twisted-pair transceiver options

RS-485 Speed	*Length*
78 Kbps	1,219 m • 4,000 ft.
156 Kbps	457 m • 1,500 ft.
312 Kbps	152 m • 500 ft.
625 Kbps	46 m • 150 ft.
1.25 Mbps	18 m • 60 ft.

Table 2. Maximum distance between nodes for RS-485 implementation

Network Node I/O Expansion

Ziatech Network Nodes provide for I/O expansion through stacking optional ZT LN70 prototyping I/O modules. Each node frame has a set of alternating screw holes which allow stacking *(see Figure 2)*. Also, for electrical operation, each node has provision for a pass-through connector that extends the I/O bus from level to level.

Prototype Capability

The ZT LN01 Network Node contains a pre-wired NEURON and transceiver interface, making it an ideal platform for prototyping application-specific nodes that may require unique signal conditioning on the NEURON I/O pins. All 11 NEURON I/O pins are available on the stacking connector including +5V, ground, and a low/true reset signal. The stacking connector is compatible with one or more of Ziatech's ZT LN70 prototyping modules.

The ZT LN70-P prototyping module uses Speedwire pins for a quick, reliable, and cost-effective means for implementing NEURON I/O pin signal conditioning. Features include: probe turret post locations for V_{CC} and ground, bypass capacitor locations, a row-column matrix for wire-list notation, and easy reusability for other projects. The ZT LN70-NP is the same except Speedwire pins are not installed.

Software Development

Software for application-specific nodes is developed on Echelon's LONBUILDER Developer's Workbench. This development system allows a PC to edit, compile, and debug node software executing on the LONBUILDER Developer's Workbench. Once developed, an EPROM is generated for the application specific node that contains the application program. Once installed on the node it can be configured into the LONWORKS control network via the network manager. One such manager is the Ziatech ZT 88CT92 Network Interface for STD 32 computers.

Ziatech's ZT 88CT92 and ZT 14CT92 provide network management capability for STD 32 industrial computers and PC/AT computers respectively. These interfaces can be used in conjunction with Ziatech's Interactive Network Management Program which provides system verification and on-line management functions. Refer to the Network Interface and Network Evaluation Kit data sheets for additional information.

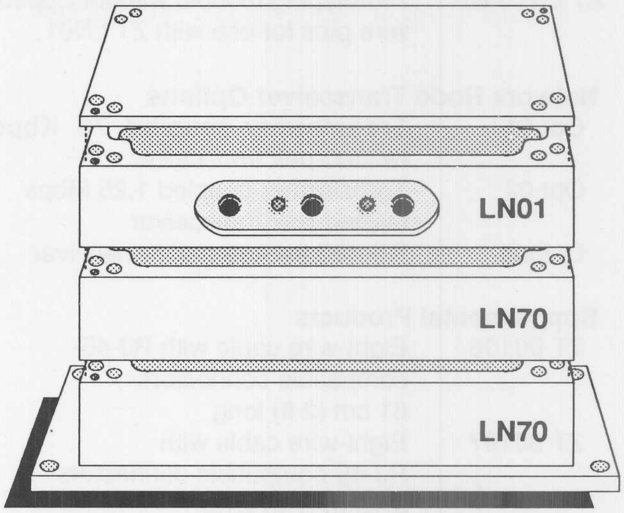

Figure 2. Ziatech Network Nodes and prototyping modules have modular frames that allow stacking.

Specifications

Mechanical

- 76.2mm (3.0") x 127.0mm (5.0") x 19.0mm (0.75") aluminum, stackable enclosure
- Bolt-down flanges on base
  76.2mm (3.0") x 152.4mm (6.0") x 7.87mm (0.31")

Connectors

- Two RJ-45s for transceiver connection to LONWORKS control network
- One stacking connector for NEURON I/O pins, power, and reset

Environmental

- -40° to +85° C operating temperature range
- -65° to +150° C storage temperature range
- 15% to 95% relative humidity at 40° C, non-condensing

Data Rates

Refer to ***Table 1***.

Ordering Information

ZT LN01	Network Node (with RS-485 transceiver)

Select transceiver option from below if transformer coupling is required.

ZT LN70-P	Prototyping module with Speedwire pins for use with ZT LN01
ZT LN70-NP	Prototyping module without Speed wire pins for use with ZT LN01

Network Node Transceiver Options

Opt 01	Transformer-coupled 78 Kbps twisted-pair transceiver
Opt 02	Transformer-coupled 1.25 Mbps twisted-pair transceiver
Default	RS-485 twisted-pair transceiver

Supplemental Products

ZT 90106	Eight-wire cable with RJ-45-compatible connectors 61 cm (2 ft) long
ZT 90107	Eight-wire cable with RJ-45-compatible connectors 2.13 m (7 ft) long

All products are shipped FOB San Luis Obispo, CA, USA. OEM discounts are available for quantity purchases. Contact Ziatech for additional information.

Ziatech provides a two-year warranty on its hardware and software products and a 90-day warranty on its disk media. For a copy of the warranty, refer to the *Technical Data Book* Appendix or contact Ziatech.

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